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Fischer, G., A. Basse, K.-H. Baumann, M. Klann, I. Klawonn,
R. Küchler, N. Nowald, G. Ruhland

**REPORT AND PRELIMINARY RESULTS OF
RV POSEIDON CRUISE P425.
Las Palmas – Las Palmas, 16.01.2012 – 30.01.2012.**

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Monika Bachur

DFG-Forschungszentrum MARUM

Universität Bremen

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Participants

Name	Domain	Institution
Fischer, Gerhard, Dr.	Chief Scientist	GeoB, Marum
Basse, Andreas	Organic Geochemistry	Marum, AWI
Baumann, Karl-Heinz	Marine Micropaleontology	GeoB, Marum
Klann, Marco	Technician	Marum
Klawonn, Isabell	Marine Ecology	Univ. Stockholm
Küchler, Rony	Organic Geochemistry	Marum
Nowald, Nico, Dr.	Marine Geology, Technology	Marum
Ruhland, Götz	Technician	Marum

AWI

Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany

GeoB

Geosciences Department, University of Bremen, Germany

Marum

University of Bremen, Bremen, Germany

Univ. Stockholm

Marine Ecology Group, Department of Systems Ecology, Univ. of Stockholm, Sweden

1. Narrative

RV Poseidon left the port of Las Palmas, Gran Canaria, Spain, on January 16th, 2012 at 8:30 pm heading to the southwest to the study area off Cape Blanc, Mauritania (Fig. 1). We planned to perform optical, microbial, micropaleontological, biological and geochemical studies of the water column as well as the exchange of two sediment trap moorings off Cape Blanc (CB and CBi). The later were deployed during RV MERIAN 18-1 cruise in April-May 2011. We also intended to deploy two drifting arrays with cyclindrical traps in the eutrophic area around site CBi for a few days. Additionally, a particle camera was planned to be launched to measure the distribution and size of marine snow aggregates and other larger particles. The studies were completed by roller tank incubation experiments with artificial marine snow aggregates. On the way, we sampled mineral dust by large volume filtration using standard dust samplers. On board were 7 scientists from the University of Bremen (Marum and GeoB) and one scientist from the University of Stockholm, Sweden.

We reached the first mooring site CB-22 in the mesotrophic study area off Cape Blanc in the morning of Wednesday 18th of January, and started with the successful recovery of the sediment trap mooring. Following this, we launched the particle camera system ParCa-Pro with CTD and the rosette-CTD. During the night, the *in situ* pumps were deployed to filter larger volumes of water for the collection of suspended particles from the water column. Following the recovery of the *in situ* pumps in the early morning of January 19th, we deployed the multinet for the sampling of zooplankton within the upper 1000 m of the water column. In the afternoon, we redeployed the long-term mooring CB-23 at the mesotrophic site. We continued our cruise about 120 nm to the east to reach the next mooring CBi-9 located in the eutrophic Cape Blanc Filament. During transit, the weather became increasingly bad, accompanied by a dust outbreak from the Sahara starting on Thursday 19th of January (Fig. 1). Due to these weather conditions, we could not do any station work at the eutrophic site CBi but continued our transect about 40 nm to the east to the continental rise of Mauritania. The weather improved and we could work at this study site located in about 700 m water depths. We did the entire sampling of the water column with particle camera, rosette-CTD, *in situ*-pumps and a day- and a night-haul with the multinet until Saturday morning, January 20th.

We sailed back with westerly course to site CBi, where we successfully recovered the long-term mooring CBi-9 equipped with two sediment traps and an optical Multi-Sensor Platform (MSP) to measure particle characteristics over an annual cycle. We proceeded with the sampling of the water column with ParCa-Pro, multinet, *in situ*-pumps for deep water particle sampling over night and two rosette water samplings in the morning of Sunday, January 22nd. We deployed a drifting sediment trap array DF-3 with two cylindrical traps in 100 and 400 m water depths to study particle degradation in the epi- and mesopelagic. Half of the collectors were filled with particle preserving gels to investigate the particle sizes and spectra of sinking intact marine snow aggregates. We finished station work with another launch of the *in situ*-pumps overnight to sample the shallower water down to 550 m water depths.

In the morning of January 23rd, we moved about 20 nm to the east to deploy the particle camera down to about 1300 m on the continental rise of Mauritania. We then sailed back to the position of the drifting trap array DF-3 which had been drifting about 3.5 nm in southeasterly direction since the deployment at the eutrophic mooring site CBi. After launching the rosette-CTD, we recovered the drifting array DF-3 successfully and received valuable samples from particles settling to 100 and 400 m water depth. The gels allowed a perfect conservation of marine snow aggregates and we will be able to study their degradation in the upper 400 m of the water column. After launching the multinet and the particle camera we sailed back to the 1300 m site for the overnight deployment of six *in situ*-pumps. They were recovered in the early morning of January 24th, followed by the launching of the rosette-CTD.

We sailed back to the site of recovery of the drifting trap array DF-3 and deployed the next drifting array DF-4 with the same configuration as before. DF-4 was planned to be installed for about two days of sampling of particles settling through the upper water column. We later moved a few miles to the eutrophic mooring site CBi to deploy the next long-term mooring CBi-10 with a large MSD (Multi-Sensor-Device) sediment trap, a Multi-Sensor Platform (MSP) with CTD-ACP and another conventional sediment trap. After doing so, we sampled the water column with the rosette-CTD and performed studies of particle distribution with the particle camera during the night.

To complete the Cape Blanc transect, we moved to the west to a study site in 3500 m water depth located between the long-term mooring sites CB and CBi. On Wednesday January 25th, we continued the water column studies with the ParCa-Pro-CTD, the multinet, the rosette-CTD and the *in situ*-pumps. Overnight, we moved back with almost easterly course to recover the drifting array DF-4 and to complete the water column studies there. We finished station work on Thursday, January 26th, after launching the particle camera, the multinet and the rosette-CTD, followed by the successful recovery of the drifting array DF-4. Again, we got perfect samples for the study of marine snow formation and degradation. We then headed back for Las Palmas, Gran Canaria, which we reached, due to unexpected favourable weather conditions, on late Sunday afternoon, January 29th, 2012.

In total, we worked on 10 stations off Cape Blanc, deploying and recovering four long-term moorings and four drifting arrays. The other deployments were: multinet (9x), ParCa-Pro-CTD

(10x), rosette-CTD (9x) and the *in situ* pumps (5x), in total 41 deployments (see station list). We could fulfil all planned station work and had a very successful cruise.

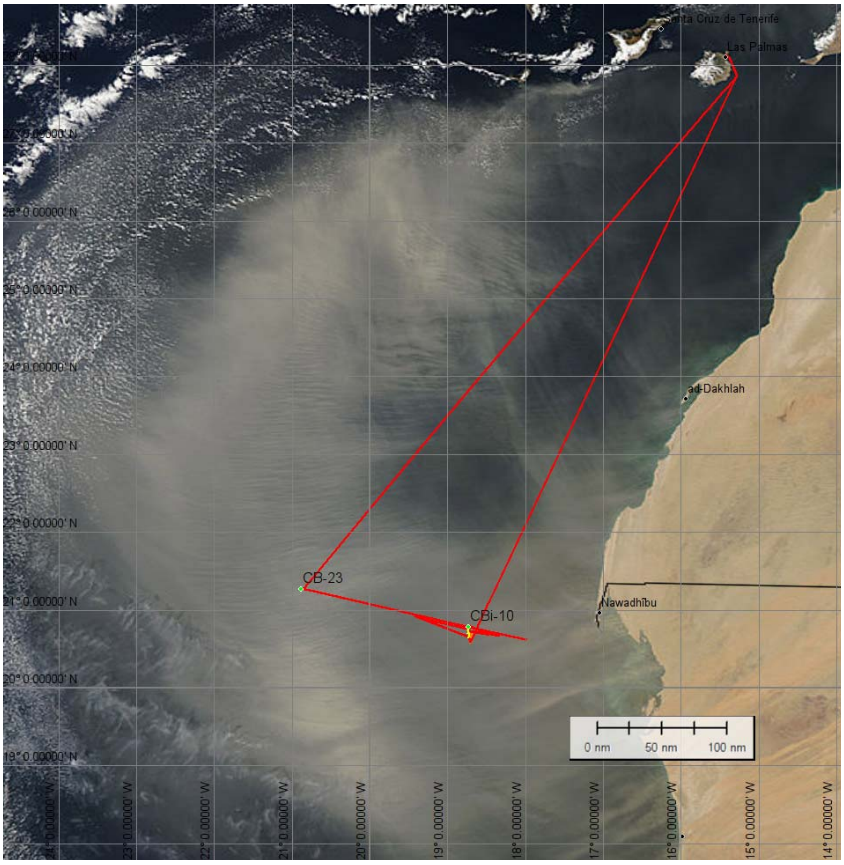

Fig. 1. Cruise track of POS 425 (Las Palmas – Las Palmas, 16.1. – 30.1.2012) with the two long-term mooring sites CB (mesotrophic) and CBi (eutrophic). A dust outbreak from the Sahara was started on January 19th, 2012, shown here in a satellite image.
(source: http://lance-modis.eosdis.nasa.gov/cgi-bin/imagery/single.cgi?image=WestAfrica.A2012019.1430.2km.jpg).

2. Preliminary Results

2.1. Atmospheric Sciences

2.1.1. Sampling of eolian dust *(R. Küchler)*

The terrigenous fraction in marine sediments consists of eolian, fluvial and reworked material from the shelf. One focus during the cruise was the sampling of eolian dust derived from the adjacent Saharan desert. With the analysis of recent dust samples, the degree of aridity in the corresponding source regions can be estimated. These results provide a useful tool to reconstruct past changes in continental climate recorded, for instance, in marine sediments.

The purpose of the dust sampling was to catch the organic fraction within the transported dust, focusing on plant-wax-derived long-chained *n*-alkanes. These compounds carry environmental-specific isotopic signals, which can be used to estimate (1) the ratio of C_3 (trees) vs. C_4 (grasses) plants ($\delta^{13}C$) of the vegetation cover, and, (2) precipitation intensities (δD) in their source regions. Especially the stable hydrogen isotopic signature of these *n*-alkanes is a novel tool in paleoclimate reconstructions, which was not yet possible to measure in present-day dust samples due to very low concentrations. A dust storm on January 19th (Fig. 2) provided potentially enough material for a first analysis of hydrogen isotopes of dust-hosted plant waxes.

The sampling was carried out with two dust collectors, equipped with air sampling pumps, which are calibrated to filter equal air volumes (approx. 40 m^3). Two kinds of filters were used: One type consists of glassfiber (GF) and is suitable for analysing the organic fraction. The other type, made of cellulose (Cell), is used for inorganic analyses, such as grain-size and mineralogical analyses. To avoid contamination with particles from the ship's funnel, the two dust collectors are linked to a wind vane with its sensor covering an angle between 270° and 90° of the ship's heading direction. The pumps stop automatically as soon as the sensor is not covering the appropriate angle. The dust collectors were placed on the observation deck of the vessel. Thirteen samples of each type of filter were taken during transit times and station work (Table 1).

Table 1. List of dust samples collected during the cruise.

Filter No.	Sample Name	Date 2012	Position		Ship		Wind	
			Long (°W)	Lat (°N)	Knots	Heading	Direction	Speed (m/s)
1	POS425-1-GF/Cell	18.-19.01.	20°51.092'	21°16.053'	-*	74°	65°	10.04
2	POS425-2-GF/Cell	19.01.	20°49.510'	21°15.613'	5.2	90°	79°	14.5
3	POS425-3-GF/Cell	19.01.	20°34.592'	21°12.313'	5.2	98°	78°	13
4	POS425-4-GF/Cell	19.-20.01.	20°13.244'	21°7.373'	6.5	98°	62°	11.3
5	POS425-5-GF/Cell	20.01.	18°49.508'	20°47.977'	5.8	101°	79°	14
6	POS425-6-GF/Cell	20.-21.01.	17°59.604'	20°36.945'	-	30°	27°	10.9
7	POS425-7-GF/Cell	21.-22.01.	18°44.435'	20°46.625'	-	98°	80°	10.9
8	POS425-8-GF/Cell	22.-23.01.	18°44.059'	20°46.715'	-	47°	58°	13
9	POS425-9-GF/Cell	23.-24.01.	18°39.383'	20°45.817'	8.4	110°	58°	11.2
10	POS425-10-GF/Cell	24.-25.01.	18°25.281'	20°40.859'	9.2	281°	66°	9.2
11	POS425-11-GF/Cell	25.-26.01.	19°25.004'	20°55.000'	-	64°	57°	9.6
12	POS425-12-GF/Cell	26.-27.01.	17°45.344'	22°40.460'	3.7	27.5°	73°	10.4
13	POS425-13-GF/Cell	27.-28.01.	16°34.493'	25°14.192'	7.6	26.3°	96°	8.6

* Stationary

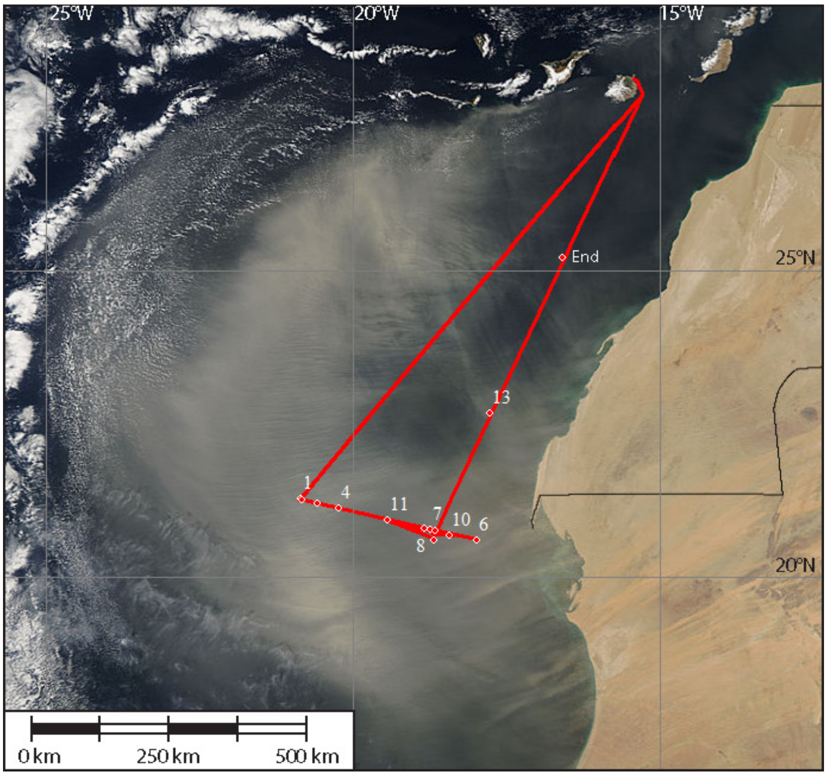

Fig. 2. Dust storm off West Africa on January 19th , 2012. Location of samples from Table 1 are shown on the cruise track. (http://lance-modis.eosdis.nasa.gov/cgi-bin/imagery/single.cgi?image=WestAfrica.A2012019.1430.2km.jpg).

2.2. Marine Microbiology

2.2.1 Microbial colonisation and decomposition of marine snow aggregates *(I. Klawonn)*

Particulate organic matter (POM) is primarily produced by photoautotrophic fixation of CO_2 and eventually turns into dead detritus ("dead" POM). The POM may aggregate due to biological aggregation (e.g. fecal pellets production) or physical aggregation (coagulation) (Burd and Jackson, 2009), and formed aggregates represent microenvironments with specific biogeochemical conditions, distinctly different from the surrounding water (Simon et al., 2002). They are rich in organic matter and release solutes which make them to a favourable food source for microbes in rather low-nutrient and low-biomass environments of deeper waters (Kiørboe et al., 2001, Ploug, 2001). Obviously, organic aggregates are densely colonized by microorganisms, and aggregate-associated bacteria which may influence the decomposition of aggregates (Grossart and Ploug, 2001). The formation, fragmentation and decomposition of marine snow aggregates is determining the distribution and fate of chemical elements in the water column and is, thus, of major significance for cycling and flux of elements in pelagic marine ecosystems.

This study imitated the sedimentation of a diatom bloom and associated 1) aggregate formation, 2) colonisation of sinking detritus by *in situ* bacteria and 3) decomposition of aggregates. The results should specify the leakage of solutes, and its transfer to microorganisms as well as the species composition of colonising microbes.

Water samples were taken with a CTD-rosette at 50 m water depths on the 24th of January 2012 at site GeoB 16106-2 for incubations in roller tanks and POC determination. Likely, productivity was high implied by a rather high chlorophyll a content of up to 0.6 µg L^{-1} from 0 to 80 m water depth. We deployed roller tanks to imitate the sedimentation of aggregates and coinciding collision of aggregates of different size and sinking velocity. The tanks were filled with seawater plus cultured *ex situ* ubiquitous marine diatoms. The axenic diatom cultures of the genus *Thalassiosira* were grown on ^{13}C and ^{15}N and served as food source for *in situ* bacteria. The isotopic labelling will enable us to follow the transfer of substrate from diatomic aggregates to attached bacteria and the remineralisation of sinking aggregates. Incubations ran over 72 h and sub-samples were taken over a time series. Each sampling included the retrieve of 1) formed aggregates and 2) cell suspension. The cell suspensions were preserved in Lugol's solution for subsequent cell counting. The aggregates were fixed in Paraformaldehyde (PFA) and filtrated for high-resolution HISH-nanoSIMS analysis (Musat et al., 2010). The HISH-nanoSIMS method allows a quantification of the transfer of ^{13}C and ^{15}N between single cells and the molecular-biological species identification of aggregate-attached microbes.

Preliminary Results

Aggregates formation proceeded rapid due to a high concentration of diatoms in the roller tanks. The size spectra of particulate material ranged from single cells to macro-aggregates of up to 10 mm (Fig. 3). The turbidity of the water in the roller tanks decreased successive due to the clearing effect of aggregate formation.

Figure 3. Large aggregate formed during the roller tank incubations with added diatoms. The length of the aggregate is about 8 mm in size.

This study should contribute to a better understanding of aggregates as critical components in the turnover and decomposition of particulate organic matter in the marine environment. A rapid remineralisation of organic matter by bacteria would decrease the vertical export of POM from the euphotic zone to the seafloor and would reduce the effectivity of the biological carbon pump.

2.3. Marine Micropaleontology

2.3.1 Plankton sampling for analysis of the coccolithophorid community (*K.-H. Baumann*)

Coccolithophores are marine unicellular algae (Prymnesiophyceae) and the predominant group of calcifying marine phytoplankton. Although much information is available on the oceanic scale distribution of coccolithophores, the environmental parameters that control their distribution are still poorly understood. This reflects, in part, a shortage of suitable studies on natural populations. The basic understanding of modern ecological affinities of the species is, however, essential for paleoecological studies using coccolith assemblages as proxies in the geological record.

Therefore, water samples of the uppermost water column from seven stations were collected during the cruise to study the species composition and the depth distribution of the coccolithophorid communities in the eastern North Atlantic off Cape Blanc. Water samples were taken from NISKIN-bottles of the rosette (see chapter 2.7.2) at 7 stations from generally ten water depths levels between 10 and 200 m (Table 2). Additionally, samples of the ship's membrane pump system from 2.5 m water depth were taken at most of the stations. Between 2.5 and 5.0 l of water was filtered immediately onboard through cellulose nitrate filters (50 mm diameter, 0.45 µm pore size) by means of a vacuum pump. Without washing, rinsing or chemical conservation, the filters were dried at 40°C for at least 24 h and then kept permanently dry with silica gel in transparent film. Studies of the distribution and composition of the coccolithophorid communities will be carried out on the filtered material using the Scanning Electron Microscope (SEM) at Bremen University.

Table 2. Water samples from rosette casts for the analysis of the depth distribution of coccolithophorids.

GeoB No.	Sample No.	Date	Lat N	Long W	Water Depth m	Sampling Depths m	Temp. °C	Salinity	Filtered Volume l
16101	I-1	18.1.12	21° 16,07'	20° 51,02'	4170	2,5	20,24	36,806	5,0
16101-1	I-2					25	20,24		5,0
	I-3					50	20,13		5,0
	I-4					75	19,99		5,0
	I-5					100	19,97		5,0
	I-6					125	19,28		5,0
	I-7					150	17,81		5,0
	I-8					175	17,57		5,0
	I-9					200	16,85		5,0
16102-3	II-1	20.1.12	20° 37,06'	17° 59,59'	756	10	18,09	36,145	3,5
	II-2					30	18,10	36,146	4,0
	II-3					50	18,06	36,135	3,75
	II-4					75	17,72	36,078	2,75
	II-5					100	17,45	36,049	5,0
	II-6					125	15,84	35,843	5,0
	II-7					150	15,24	35,823	5,0
	II-8					175	15,21	35,853	5,0
16103	III-1	22.1.12	20° 46,72'	18° 44,12'	2725	2,5	19,50	36,600	4,5/3,0
16103-6	III-2					10	19,43	36,613	4,0
	III-3					30	19,43	36,612	4,5
	III-4					50	19,43	36,613	4,0
	III-5					70	19,43	36,614	4,5
	III-6					90	19,01	36,698	5,0
	III-7					110	18,01	36,583	5,0
	III-8					130	17,38	36,445	5,0
16103-5	III-9					150	17,16	36,402	5,0
	III-10					175	16,26	36,241	5,0
	III-11					350	12,85	35,716	3,5
16105	IV-MP	23.1.12	20° 43,58'	18° 43,04'	2738	2,5	19,45	36,615	3,5
16105-1	IV-1					20	19,41	36,627	3,5
	IV-2					40	19,40	36,627	3,5
	IV-3					60	19,40	36,627	3,5
	IV-4					80	19,40	36,627	3,5
	IV-5					100	19,40	36,634	5,0
	IV-6					120	18,59	36,649	5,0
	IV-7					140	17,55	36,495	5,0
	IV-8					200	16,02	36,238	5,0
	IV-9					250	14,96	36,043	5,0

Table 2. continued

GeoB No.	Sample No.	Date	Lat N	Long W	Water Depth m	Sampling Depths m	Temp. °C	Salinity	Filtered Volume l
16106	V-MP	23.1.12	20° 39,99'	18° 20,00'	1353	2,5	18,37	36,219	3,0
16106-2	V-1					10	18,39	36,237	4,5
	V-2					30	18,38	36,238	4,0
	V-3					50	18,32	36,222	4,5
	V-4					70	17,25	36,009	5,0
	V-5					90	16,68	35,914	5,0
	V-6					110	16,41	35,905	5,0
	V-7					130	16,84	36,214	5,0
	V-8					150	16,22	35,152	5,0
	V-9					175	14,93	35,846	5,0
16108	VI-MP	24.1.12	20° 44,71'	18° 44,73'	2795	2,5	19,63	36,692	4,5
16108-2	VI-1					20	19,49	36,674	4,0
	VI-2					40	19,51	36,682	4,0
	VI-3					60	19,54	36,694	4,5
	VI-4					80	19,54	36,712	4,5
	VI-5					100	18,54	36,615	5,0
	VI-6					125	17,48	36,422	5,0
	VI-7					150	16,79	36,336	5,0
	VI-8					175	16,04	36,218	5,0
	VI-9					200	15,66	36,167	5,0
16109	VII-MP	25.1.12	20° 55,00'	19° 25,01'	3460	2,5	19,67	36,702	3,0
16109-3	VII-1					10	19,63	36,728	4,5
	VII-2					30	19,61	36,707	4,5
	VII-3					50	19,58	36,701	4,5
	VII-4					70	19,59	36,705	4,75
	VII-5					90	19,60	36,707	5,0
	VII-6					110	19,60	36,707	4,5
	VII-7					130	18,56	36,568	5,0
	VII-8					150	17,35	36,331	5,0
	VII-9					175	17,06	36,417	5,0
	VII-10					400	12,15	35,584	5,0

2.4. Marine Zoology

2.4.1 Mesozooplankton collected with the multinet *(M. Klann and G. Fischer)*

We used a multiple net from HYROBIOS, Kiel, fitted with five nets of 200µm mesh size to sample mesozooplankton in various depth ranges from the water column in the Cape Blanc area. Except at site GeoB-16102 where water depth was only around 700 m (see station list), we used standard collection depths of 1000-600, 600-400, 400-150, 150-80 and 80-0 m (Table 3). Nine profiles were successfully taken and in most cases enough material was collected to analyze species, numbers and distribution of important zooplankton species in the water column. Partly, the 1-2 upper nets were clogged leading to the collection of smaller particles such as phytoplankton, aggregates and pellets.

When feasible, we did a day and a night haul at the same site to account for dial vertical migration. We plan to investigate the importance of zooplankton (e.g. copepods, euphausiids, appendicularia) for particle degradation in the upper water column, mainly in the epi- and mesopelagic. This work will be done in cooperation with the Geomar (R. Kicko), studying zooplankton mainly in the TENATSO area off the Cape Verde Islands.

Table 3. Samples taken with the multiple plankton net equipped with nets of 200 µm mesh size. Standard sampling depths with the five nets were: 1) 1000-600, 2) 600-400, 3) 400-150, 4) 150-80 and 5) 80-0 m. Other depth ranges are indicated below.

Station No. GeoB-No.	Date 2012	Time MN at depth UTC	Latitude N	Longitude W	Water depths m	Remarks
16101-6	19.1.	08:27	21°16,09’	20°51,04’	4163	Standard
16102-3	20.1.	20:42	20°37,02’	17°59,49’	754	1: 700-600m
16102-5	21.1.	09:02	20°37,02’	17°59,41’	751	1: 700-600m
16103-3	21.1.	21:11	20°46,70’	18°44,10’	2735	Standard
16103-7	22.1.	13:34	20°46,72’	18°44,13’	2733	Standard
16105-3	23.1.	18:28	20°43,23’	18°42,48’	2722	Standard
16109-2	25.1.	09:34	20°54,98’	19°25,01’	3454	Standard
16109-5	25.1.	20:59	20°55,00’	19°25,00’	3493	Standard
16110-3	26.1.	09:33	20°36,00’	18°42,61’	2630	Standard

2.5. Organic Biogeochemistry

2.5.1. Alteration and lateral transport of particulate organic matter *(A. Basse)*

The relationships between marine production, flux of particulate organic matter (POM) and burial in the sediments are well documented from sediment trap and core top data. However, recent studies emphasize that lateral transport and alteration of POM in the water column have a strong influence on the POM flux. To better understand these processes, filtrations of particulate organic matter from different water depths were done using samples taken with *in situ*-pumps (Table 4, Fig. 4). First results from POM samples taken during MSM 11-2 in 2009, POS 396 cruise in 2010 and MSM 18-1 cruise in 2011 showed a significant variation in the signal of lipid biomarkers in the water column. Especially in the Nepheloid Layers (NLs) the composition of the POM shows differences compared to particles from the rest of the water column. Even the diverse NLs seem to have different lipid-compositions, which might result from different sources or various forms and/or states of microbial degradation. The Intact Polar Lipid (IPL) abundance also changes significantly in the Intermediate Nepheloid Layer (INL) in 300-400 m, which could reflect variations in the archean communities. To get a more detailed picture of the area around the INL, we decided to increase sampling density in the upper part of the water column (50-600 m) at the eutrophic CBi site. We took water samples (Table 5) for nutrient analysis to study the relationship between nutrient conditions and archean communities derived from the IPL-composition.

Sample analysis will be performed in the home laboratories at the University of Bremen and the data will be compared to results from previous expeditions. The analysis will focus on the composition of the POM collected with filters, with special emphasis on the concentrations of specific biomarkers and IPLs. The key objectives of the investigations are:

- to compare, complement and confirm the results from the cruises MSM 11-2, POS 396, MSM 18-1,
- to better understand the processes of lateral transport within the nepheloid layers,
- to characterise intact polar lipid abundances with special emphasis on the microorganism communities.

Table 4. Samples filtered with *in-situ*-pumps.

Station	Date 2012	Depth	Lat N	Long W	Water filtered (l)
GeoB16101-5	19.01.	55	21°16.0	20°51.0	484
GeoB16101-5	19.01.	250	21°16.0	20°51.0	1566.5
GeoB16101-5	19.01	350	21°16.0	20°51.0	870.4
GeoB16101-5	19.01.	1000	21°16.0	20°51.0	820.78
GeoB16101-5	19.01.	2500	21°16.0	20°51.0	12.64
GeoB16101-5	19.01.	4000	21°16.0	20°51.0	7.2
GeoB16103-9	22.01.	50	20°47.0	18°44.1	347.67
GeoB16103-9	22.01	150	20°47.0	18°44.1	1072.14
GeoB16103-9	22.01.	280	20°47.0	18°44.1	388.43
GeoB16103-9	22.01.	350	20°47.0	18°44.1	1559.26
GeoB16103-9	22.01.	400	20°47.0	18°44.1	979.64
GeoB16103-9	22.01	500	20°47.0	18°44.1	869.33
GeoB16103-4	22.01	700	20°47.0	18°44.1	1729.63
GeoB16103-4	22.01	1050	20°47.0	18°44.1	1647.63
GeoB16103-4	22.01	1500	20°47.0	18°44.1	824.36
GeoB16103-4	22.01	2000	20°47.0	18°44.1	1596.55
GeoB16103-4	22.01	2350	20°47.0	18°44.1	1529.81
GeoB16103-4	22.01	2690	20°47.0	18°44.1	654.22
GeoB16102-4	21.01.	50	20°37.0	17°59.0	377.25
GeoB16102-4	21.01	200	20°37.0	17°59.0	784.71
GeoB16102-4	21.01	300	20°37.0	17°59.0	1818.97
GeoB16102-4	21.01	450	20°37.0	17°59.0	1338.46
GeoB16102-4	21.01	600	20°37.0	17°59.0	2042.44
GeoB16102-4	21.01	720	20°37.0	17°59.0	839.02

Table 4. continued

Station	Date 2012	Depth	Lat N	Long W	Water filtered (l)
GeoB16106-1	24.01.	50	20°39.97	18°20.00	411.94
GeoB16106-1	24.01.	150	20°39.97	18°20.00	796.98
GeoB16106-1	24.01.	280	20°39.97	18°20.00	2.24
GeoB16106-1	24.01.	600	20°39.97	18°20.00	1753.26
GeoB16106-1	24.01.	1150	20°39.97	18°20.00	1480.05
GeoB16106-1	24.01.	1300	20°39.97	18°20.00	11.56
GeoB16109-4	25.01.	50	20°55.0	19°25.0	358.23
GeoB16109-4	25.01.	150	20°55.0	19°25.0	902.64
GeoB16109-4	25.01.	400	20°55.0	19°25.0	1128.26
GeoB16109-4	25.01.	1000	20°55.0	19°25.0	220.44
GeoB16109-4	25.01.	2200	20°55.0	19°25.0	1176.54
GeoB16109-4	25.01.	3400	20°55.0	19°25.0	53.44

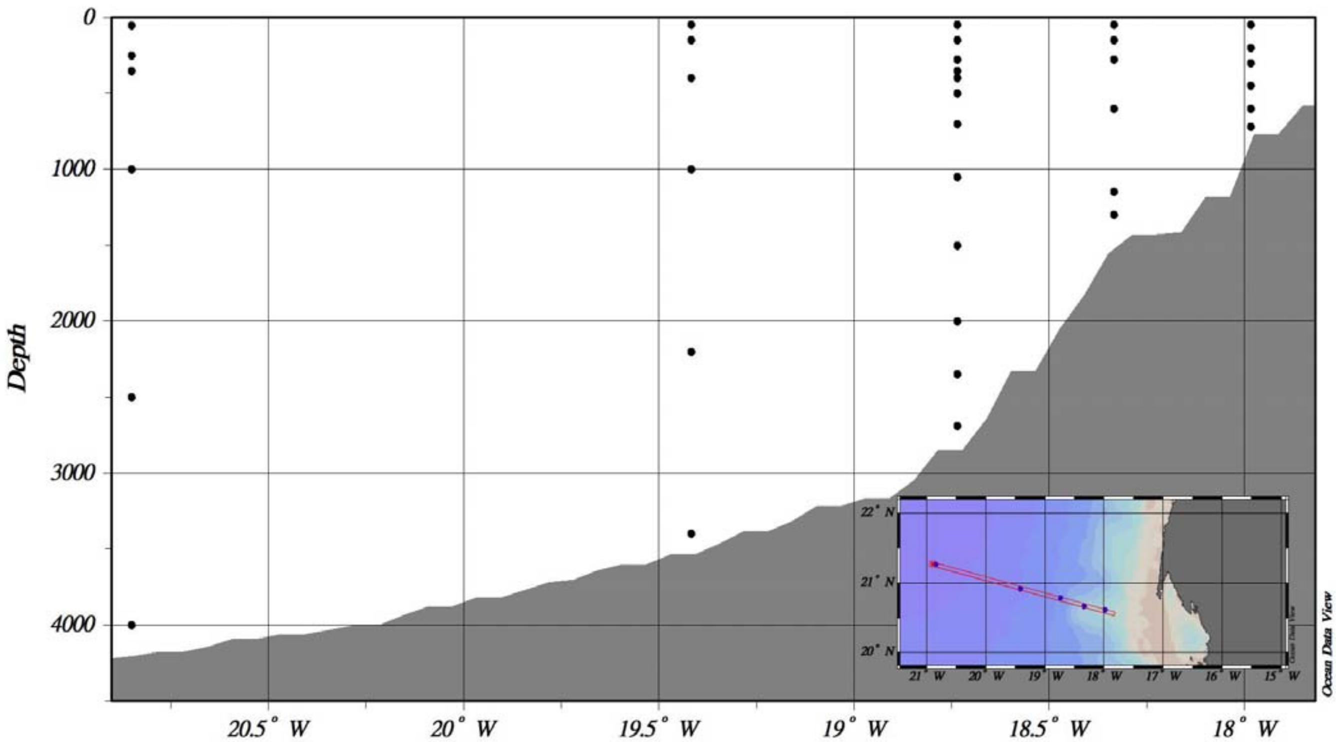

Figure 4. Positions of samples taken with the *in situ*-pumps in the water column along a transect off Cape Blanc (see insert to the lower right).

Table 5.Water samples (each 20 ml) taken for nutrient analysis from the NISKIN bottles of the rosette.

Station	Date	Depth	Lat N	Long W
GeoB16101-3	18.1.12	50	21°16.0	20°51.0
GeoB16101-3	18.1.12	100	21°16.0	20°51.0
GeoB16101-3	18.1.12	150	21°16.0	20°51.0
GeoB16101-3	18.1.12	250	21°16.0	20°51.0
GeoB16101-3	18.1.12	350	21°16.0	20°51.0
GeoB16101-3	18.1.12	450	21°16.0	20°51.0
GeoB16101-3	18.1.12	1000	21°16.0	20°51.0
GeoB16103-5	22.1.12	50	20°47.0	18°44.1
GeoB16103-5	22.1.12	150	20°47.0	18°44.1
GeoB16103-5	22.1.12	280	20°47.0	18°44.1
GeoB16103-5	22.1.12	350	20°47.0	18°44.1
GeoB16103-5	22.1.12	400	20°47.0	18°44.1
GeoB16103-5	22.1.12	500	20°47.0	18°44.1
GeoB16103-5	22.1.12	700	20°47.0	18°44.1
GeoB16103-5	22.1.12	1050	20°47.0	18°44.1
GeoB16103-5	22.1.12	1500	20°47.0	18°44.1
GeoB16103-5	22.1.12	2000	20°47.0	18°44.1
GeoB16103-5	22.1.12	2350	20°47.0	18°44.1
GeoB16103-5	22.1.12	2690	20°47.0	18°44.1
GeoB16102-4	21.1.12	50	20°37.0	17°59.0
GeoB16102-4	21.1.12	175	20°37.0	17°59.0
GeoB16102-4	21.1.12	200	20°37.0	17°59.0
GeoB16102-4	21.1.12	300	20°37.0	17°59.0
GeoB16102-4	21.1.12	450	20°37.0	17°59.0
GeoB16102-4	21.1.12	730	20°37.0	17°59.0
GeoB16106-2	24.1.12	50	20°39.97	18°20.00
GeoB16106-2	24.1.12	100	20°39.97	18°20.00
GeoB16106-2	24.1.12	150	20°39.97	18°20.00
GeoB16106-2	24.1.12	300	20°39.97	18°20.00
GeoB16106-2	24.1.12	600	20°39.97	18°20.00
GeoB16106-2	24.1.12	1150	20°39.97	18°20.00
GeoB16106-2	24.1.12	1300	20°39.97	18°20.00
GeoB16109-3	25.1.12	50	20°55.0	19°25.0
GeoB16109-3	25.1.12	150	20°55.0	19°25.0
GeoB16109-3	25.1.12	400	20°55.0	19°25.0
GeoB16109-3	25.1.12	1000	20°55.0	19°25.0
GeoB16109-3	25.1.12	2200	20°55.0	19°25.0

2.6. Optical studies

2.6.1. Vertical particle abundance acquired with the profiling camera system ParCa-Pro *(N. Nowald))*

System description

ParCa-Pro (Fig. 5) is a vertically profiling camera system for the optical acquisiton of particulate matter in the water column. ParCa-Pro consists of a Kodak ProBack, 16 Megapixel digitilization device behind the optics of an analogue Photosea, 60 mm middle format camera. A strobe, mounted perpendicular to the optical axis of the camera provides a collimated light beam of 12 cm width, illuminating a sample volume of about 12 l of seawater.

The camera is equipped with a micro-controller and a SBE-36 telemetry unit for full control during the deployment via the ship's coaxial wire. The camera is triggered in given depth intervals, usually 10 m, by the depth sensor of a SBE-19 CTD, that also collects oceanographic data during the deployment of the camera. ParCa-Pro can be deployed to a depth of 4000 m. The system is powered by a 24V/38Ah DSPL battery and overall weight of the system is roughly 250 kg. A detailed station list of ParCa-Pro deployments along the cruise is given in Table 6.

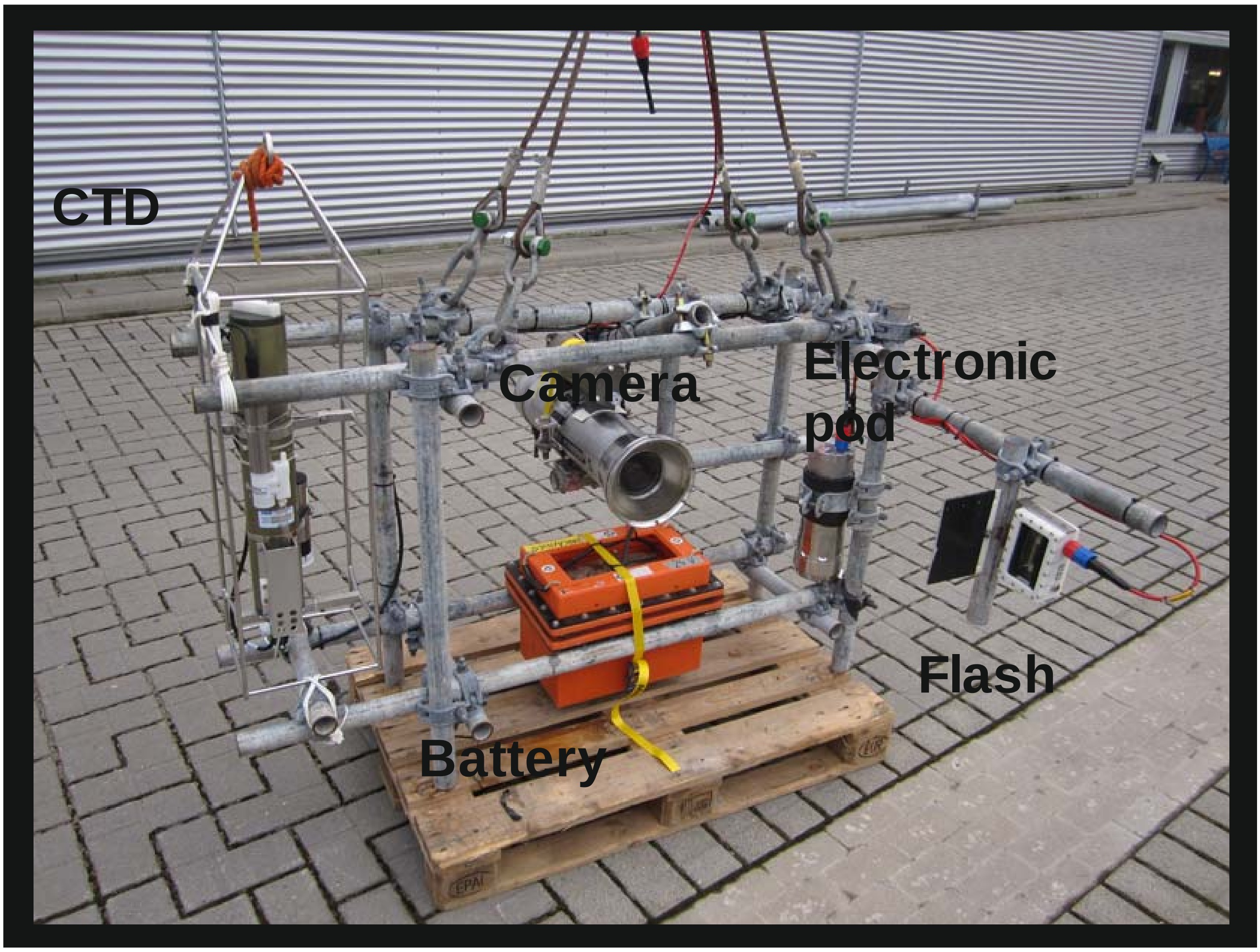

Fig. 5. Profiling particle camera system ParCa-Pro together with the CTD SBE-19 (equipped with oxygen and WETLABS chlorophyll fluorescence and turbidity sensors).

Table 6. List of profiling stations of ParCa-Pro with the CTD SBE-19.

GeoB #	Date 2012	Deploy time UTC	Latitude N	Longitude W	Water depth m	Profile length m
16101-2	18.01.	14:40	21°16.09N	20°50.99W	4162	500
16101-3	18.01.	16:00	21°16.11N	20°50.96W	4162	2000
16101-5	18.01.	21:10	21°16.08N	20°51.01W	4180	3910
16102-1	20.01.	18:08	20°36.92N	17°59.62W	755	720
16103-2	21.01.	18:00	20°46.72N	18°44,10W	2772	2600
16104-1	23.01.	11:25	20°39,99N	18°19,97W	1360	1270
16105-4	23.01.	19:30	20°43,22N	18°42,44W	2724	600
16108-3	24.01.	19:43	20°44,71N	18°44,67W	2786	2680
16109-1	25.01.	06:10	20°55,00N	19°25,04W	3461	3310
16110-1	26.01.	06:20	20°36,98N	18°42,50W	2627	2530

Preliminary results

ParCa-Pro was deployed at 10 stations in order to acquire particulate matter in the ocean and to locate suitable sampling depths of particle maxima for the sampling with the CTD-rosette and the *in situ*-pumps. Five particle profiles were taken along an east-west transect in water depths between 700 m close to the Mauritanian coast and 4000 m further offshore (Fig. 6).

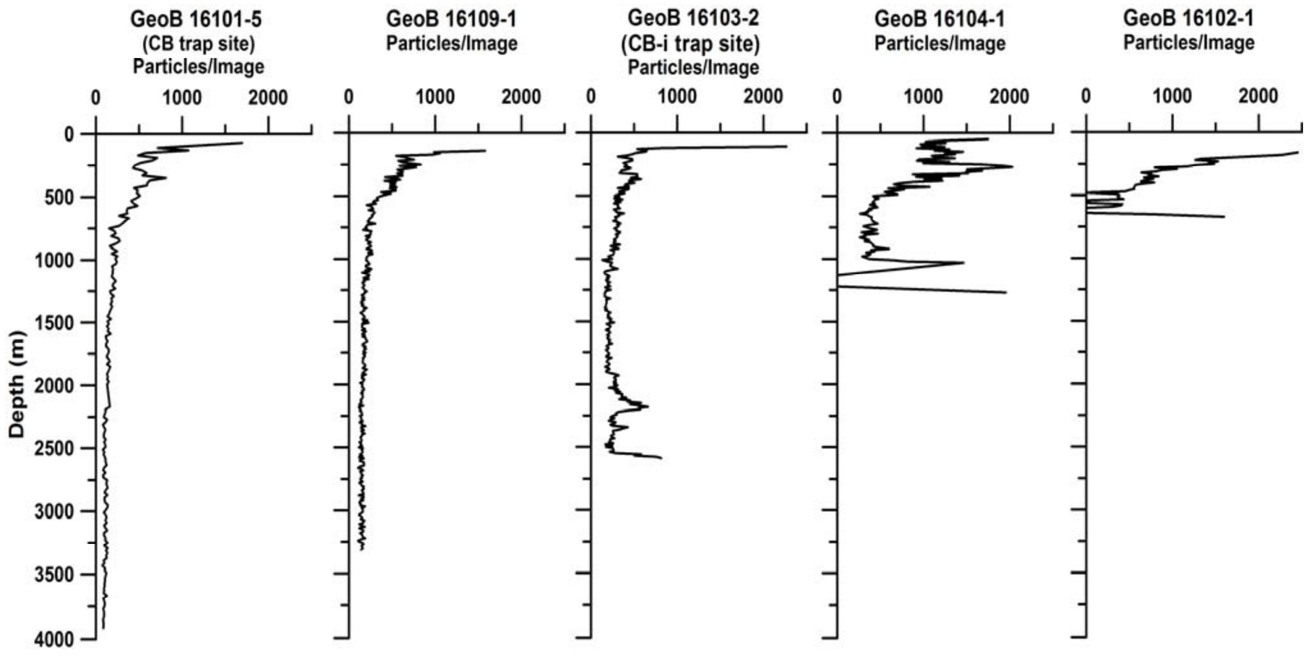

Fig. 6. West-East transect of particle profiles (preliminary) from the continental slope (right) to the open ocean (left; off Cape Blanc, Mauritania) with the ParCa-Pro system (with CTD SBE-19). Note the high particle concentrations near the surface, in the intermediate and the bottom-near layers.

Highest particle counts were found in the surface waters, decreasing rapidly within the first 500 m of the water column. Particle numbers in the ocean surface are higher at stations close to the coast (> 2000 particles/image, GeoB 16102, GeoB 16103-2, GeoB 16104-1), compared to those from stations offshore (GeoB 16109-1, GeoB 16101-5). The latter stations are also characterised by more or less constant particle counts below 500 m water depth, whereas at stations GeoB 16103-2, GeoB 16104-1 and 16102-1, increased particle numbers are also seen in the mid-water and above the seafloor.

Of special interest was the mid-water particle maximum at the eutrophic sediment trap site CBi (GeoB 16103-2) that was repeatedly observed during several earlier campaigns (e.g. POS 344 and 396) in water depths between 1600 m and 2200 m. In order to track the changes in the particle abundance over time in specific depths ranges, a time series of three profiles was obtained during the cruise (Fig. 7). The time series was also taken to observe possible changes in the particle abundance and particle size related to the dust storm outbreak that occurred during the cruise on January 19th. However, this requires detailed work on the particle images and an additional comparison with water and net samples in the home laboratory.

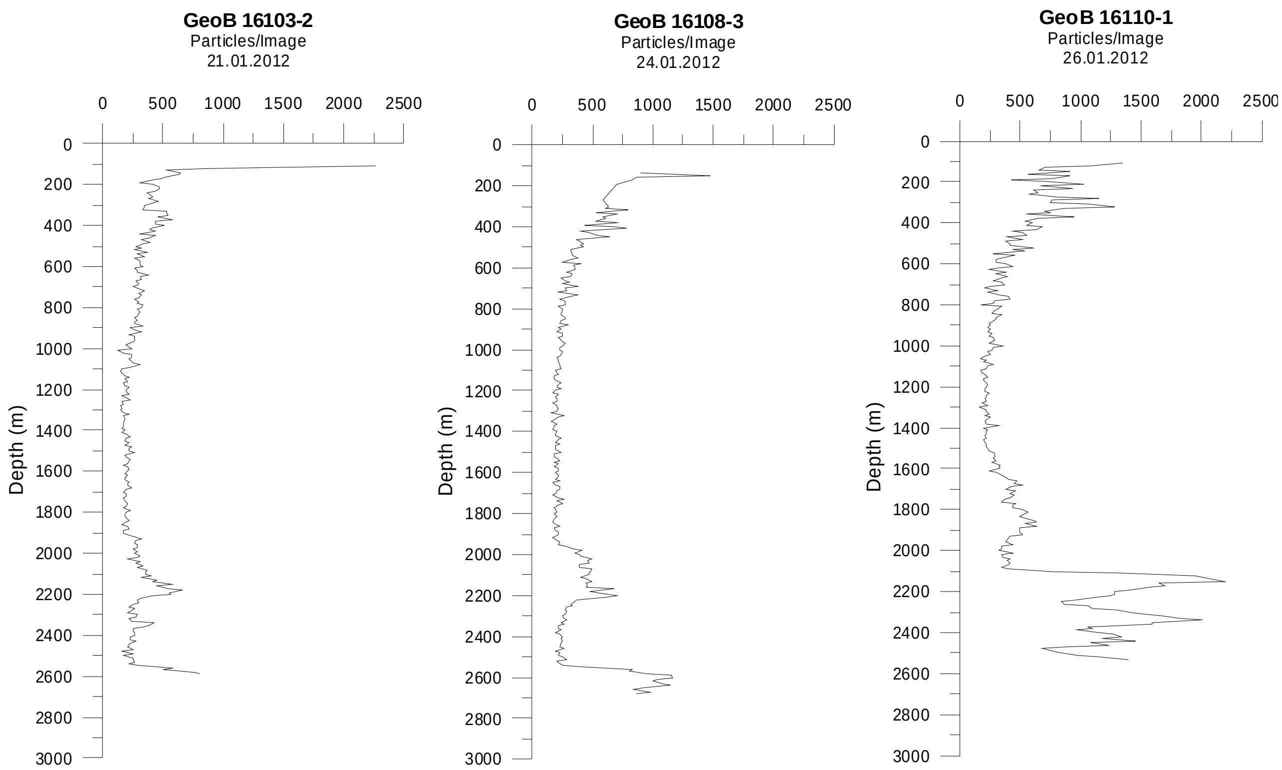

Fig. 7. Preliminary time series of particle camera profiles (ParCa-Pro) acquired at and near the eutrophic CBi sediment trap station. For comparison, see Figure 13 where the turbidity profiles are shown for the same sites.

At stations GeoB 16103-2 and 16108-3, the mid-water particle layer was located in depths between 1900 m and 2200 m with almost similar particle counts of around 600 particles/image. Furthermore, no significant changes can be observed for particle numbers within the maximum located directly above the seafloor between the 21st and 24th of January. Two days later, however, particle abundance was different in depths below 1600 m at site GeoB 16110-1 (Fig. 10). The mid-water layer, located between 1900 m and 2200 m at GeoB 16103-2 and 16108-3, appears to be shifted upwards to a depth zone between 1600 m and 1900 m. The strongest change is seen in the area directly above the ocean floor. The particle layer above the seafloor is extended upwards and shows higher particle numbers. It reached a water depth of 2100 m with particle counts of 2500 particles/image. The reasons for this observations remain unclear up to now. The profile was acquired 6 nm south of the profiles GeoB 16103-2 and 16108-3.

A very high, and never observed abundance of elongated particles was found in the upper water column in profiles acquired close to the coast (e.g. GeoB 16102-1, GeoB 16104-1 or GeoB 16105-4) (Fig. 8). A first onboard comparison with material collected with the multinet leads to the careful conclusion, that these objects are most likely fecal pellets from mesozooplankton. This hypothesis has to be tested in later studies.

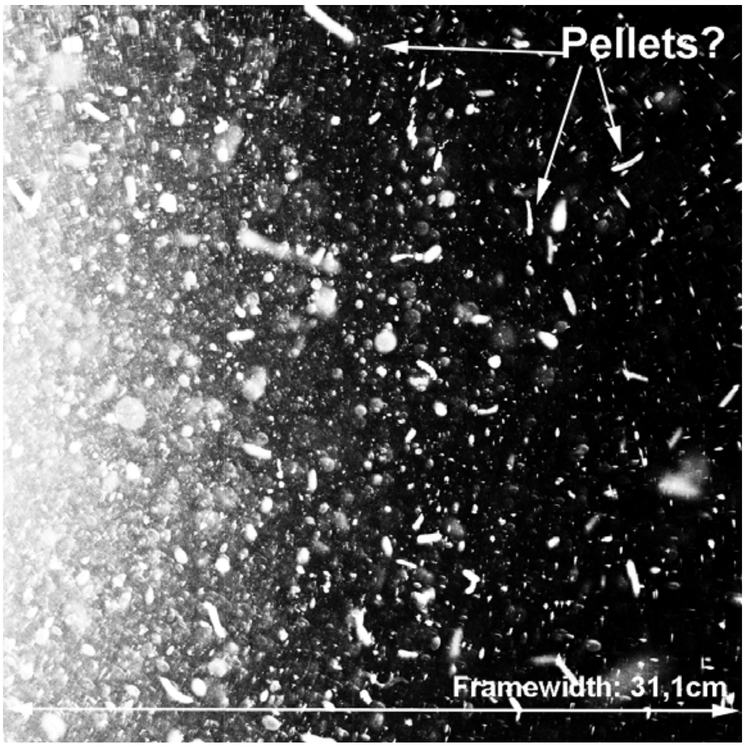

Fig. 8. ParCa-Pro image from station GeoB 16105-4 in 60 m water depth, showing a high abundance of elongated particles, most probably fecal pellets. Frame width is shown.

2.6.2 Video records with the Multi-Sensor Platform (MSP) *(N. Nowald)*

The MSP is a module within the mooring array CBi that was deployed for the first time during POS cruise 365 in 2008. The platform moored in a water depth of 1130 m, carried an FSI-CTD with Acoustic Current Meter (ACM) and a HD videocamera system (Fig. 9). The camera is programmed via a micro-controller and records a 30 second video sequence on a 60 minute DV tape every third day. The system is powered by a 12V/38Ah DSPL battery and uses the same optical setup as the ParCa-Pro camera. Between the 30th of April 2011 and the 20th of January 2012, the camera recorded 89 sequences that will be used for the determination of particle concentration and size measurements. Digitalisation of the video footage and image processing will be done at MARUM, University of Bremen.

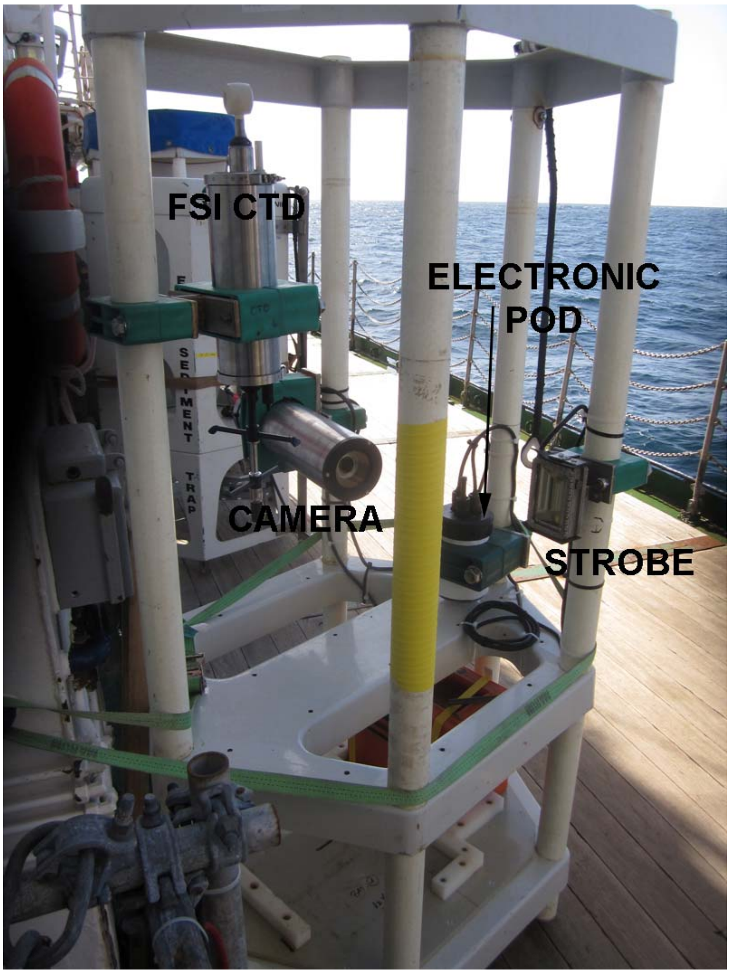

Fig. 9. The Multi-Sensor Platform (MSP) after the recovery onboard FS POSEIDON with video camera, CTD and strobe light. This system was installed in the long-term mooring CBi-9 and redeployed in CBi-10 (Fig. 16).

The MSP´s Faltmouth Scientific (FSI) CTD probe collected oceanographic data between the 30th of April and the 11th of June 2011. Average current speed was 7 cm s^{-1} and reached highest values in early June of almost 9 cm s^{-1} (Fig. 10). Predominant current direction was along an ENE-WSW axis (Fig. 10). Salinity ranged from 34.85 %o to 35.25 %o, while temperature were between 5.9°C and 9°C. From the 30th of April to the 28th of May, temperature and salinity are slightly higher compared to the second half of the T-S- record (Fig. 11).

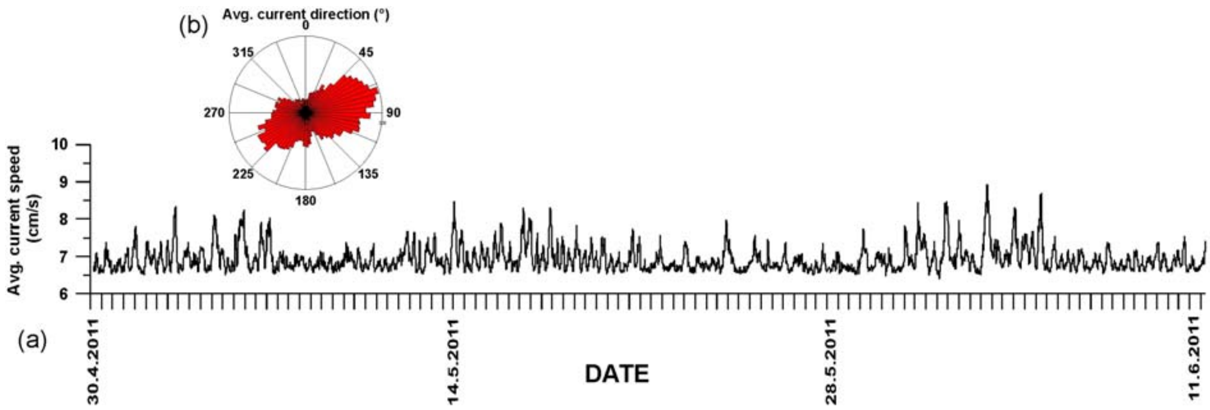

Fig. 10. Time series of average current speed (a) and current direction (b) acquired by the FSI-CTD probe from 1130 m water depth in spring 2011.

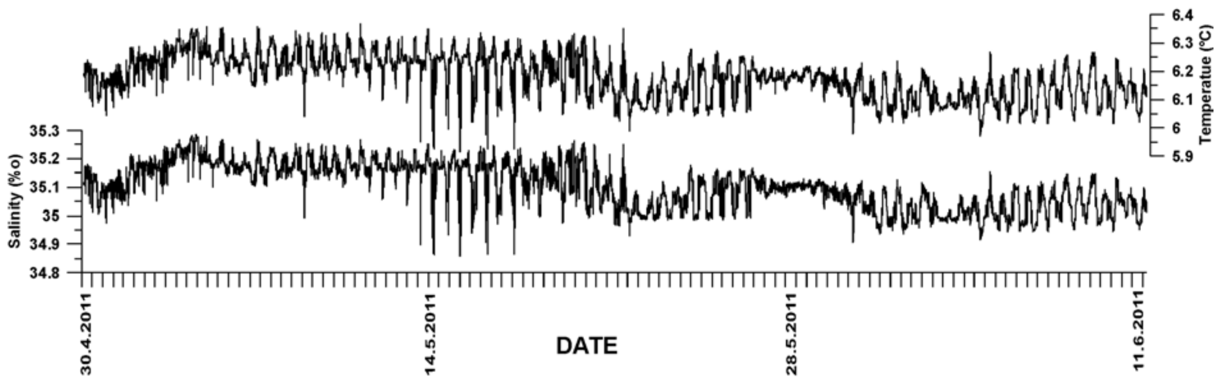

Fig. 11. Time series of temperature and salinity data in spring 2011 collected with the FSI-CTD from 1130 m water depth.

As the MSP is moored in a water depth of 1130 m, it is located within the boundary zone of the Antarctic Intermediate water (AAIW) and the North Atlantic Depth Water (NADW). With the aid of the temperature-salinity scatter plot (Fig. 12), three water masses can be identified that are most likely AAIW, Mediterranean Outflow Water (MOW) and NADW. Temporal intrusions of MOW may have occurred.

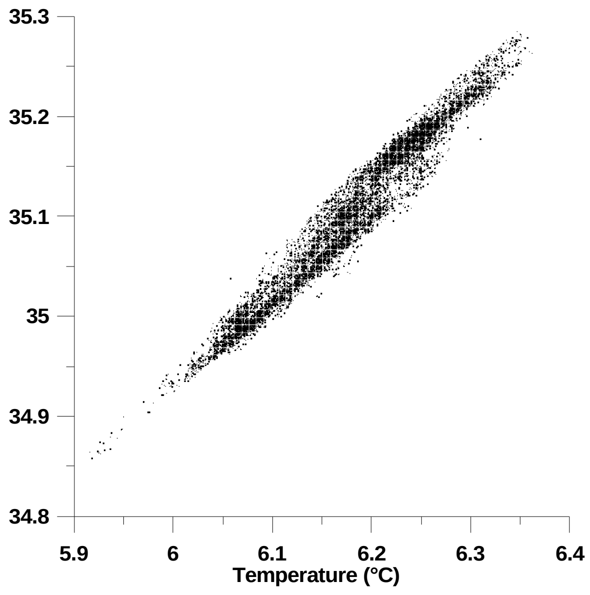

Fig. 12. Scatter plot of temperature versus salinity (derived from the FSI-CTD record) showing mainly three different water masses of AAIW, MOW and NADW.

2.7. Oceanography

2.7.1 CTD-O_2-chlorophyll-fluorescence-turbidity probe (SBE-19) *(N. Nowald, G. Fischer)*

Ten CTD/O_2/chlorophyll-fluorescence profiles were taken with a self-contained SBE 19 profiler equipped with a conductivity-temperature-depth probe plus oxygen sensor, a CHELSEA-fluorometer and a WETLAPS turbidity sensor. This CTD was attached to the frame of the ParCa-Pro system and was deployed ten times during the cruise (see Table 6 and station list). The data were removed immediately after recovery of the system and standard downcast plots were made. Data were compared to the measurements with the shipboard SBE 5-CTD (9 profiles were acquired, see station list) which was equipped with a chlorophyll fluorecence and two oxygen sensors. Salinity and temperature data fitted well between the two CTD systems. The oxygen values of the SBE-3 were higher than of the SBE-19 profiler, where the oxygen sensor appears to be altered.

Our major interest was on the turbidity records of the water column in the area of the continental slope of Mauritania, where particles are transported offshore into the open ocean. From previous studies, surface, intermediate, mid-water and a bottom-near particle layers were expected. Generally, particle characteristics of larger sized particles are preferentially recorded with the ParCa-Pro system (chapter 2.6.1), whereas the finer particle sizes should be seen with the turbidity sensor. However, due to the increased resolution of the new ParCa-Pro system, particle distributions with the turbidity sensor and the particle camera are often quite similar (Figs. 7 and 13). In Figure

13, the three profiles indicate some temporal variability of particle distribution in the water column measured with the turbidity sensor at the eutrophic sediment trap site CBi.

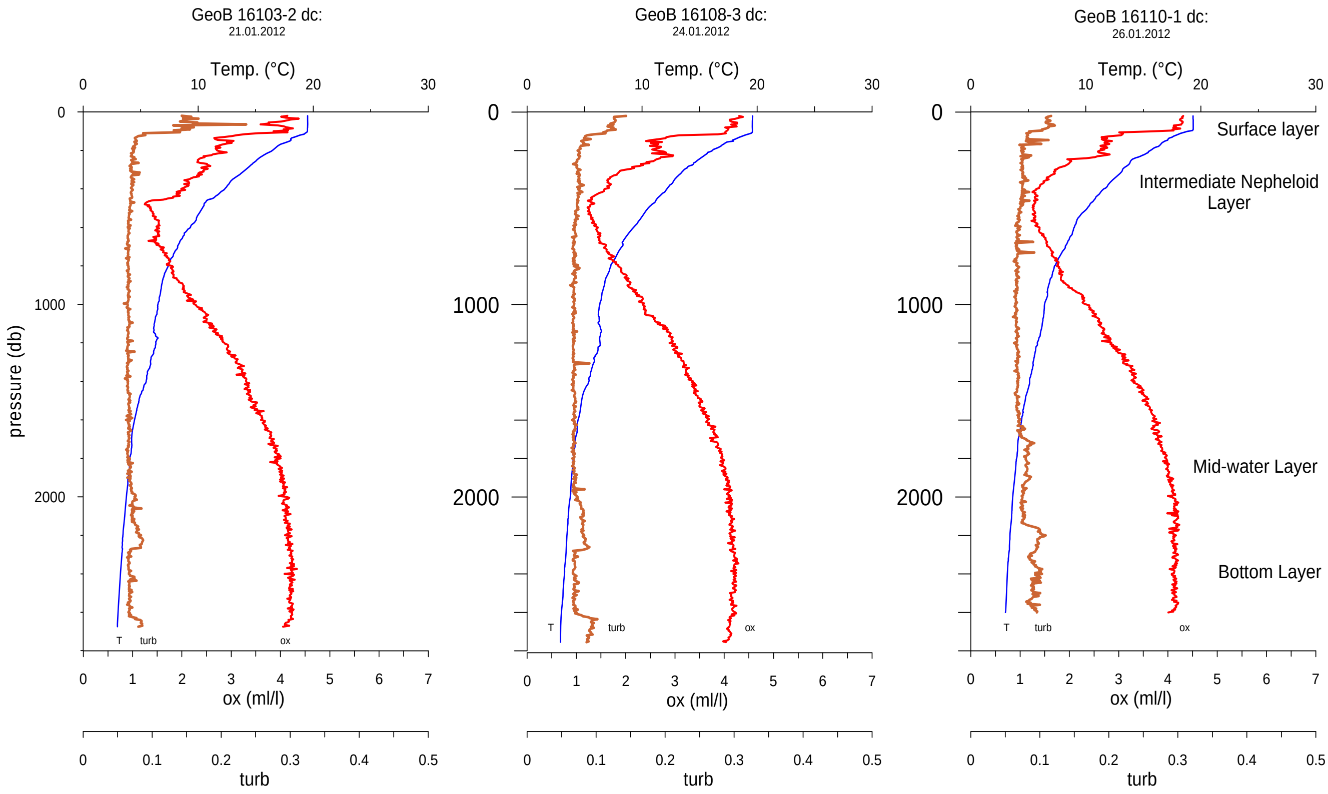

Fig. 13. SBE-19-CTD-oxygen-turbidity time series taken at the eutrophic mooring site CBi. Samples were taken on January 21, 24, and 26, 2012, indicating some temporal variability of particle distribution, mainly in the deeper water column. Layers were defined according to the right turbidity profile. For comparison, see particle camera profiles in Fig. 7, where the Mid-water Layer (poorly developed here) and the Bottom Layer are more clearly seen.

Table 6. List of CTD-O_2-chlorophyll-fluorescence turbidity profiles taken with the SBE-19 profiler attached to the ParCa-Pro system (see chapter 2.6.1).

GeoB station #	Date 2012	Time UTC	Latitude N	Longitude W	Water depth m	Deployment depth M
16101-2	18.01	15:03	21°16,09’	20°55,99’	4163	510
16101-3	18.01	17:10	21°16,10’	20°51,00’	4163	2055
16101-5	18.01	23:07	21°16,09’	20°51,01’	4160	4020 (with ISP*)
16102-1	20.01	18:33	20°36,96’	17°59,59’	755	735
16103-2	21.01	19:36	20°46,71’	18°44,12’	2756	2670
16104-1	23.01	12:18	20°40,00’	18°20,00’	1353	1300
16105-4	23.01	19:53	20°43,23’	18°42,43’	2718	610
16108-3	24.01	21:19	20°44,72’	18°44,71’	2785	2754
16109-1	25.01	07:52	20°55,04’	19°25,01’	3454	3400
1610-1	26.01	07:47	20°36,98’	18°42,50’	2636	2600

* deployment of particle camera as weight for *in situ*-pumps (ISP)

2.7.2 Rosette with CTD-O_2-chlorophyll-fluorescence probe (shipboard SBE-5)

(K.-H. Baumann)

Seven profiles with the shipboard SBE 5-CTD were acquired (Table 7, see station list) which was equipped with oxygen sensors and fluorometer was launched together with the multiple water collectors (rosette with 12 x 10 l bottles). Water samples were taken for incubations in roller tanks (see chapter 2.2) to perform artificial aggregates, for coccolithophorid counts as well as for the organic geochemistry of particles in the water column (see chapter 2.5).

Table 7. List of CTD-rosette profiles and depths of water samples taken with the NISKIN bottles. Water samples were taken for micropaleontological, microbial and organic chemistry analysis.

Station No. GeoB	Latitude N	Longitude W	Water depth m	Water depths of samples m
16101-1	21° 16,07'	20° 51,02'	4170	25, 50, 75, 100, 125, 150, 175, 200, 250, 350, 450, 1000m
6102-2	20° 37,06'	17° 59,59'	756	10, 30, 50, 75, 100, 125, 150, 175, 200, 300, 450, 730m
16103-5	20° 46,72'	18° 44,12'	2725	150, 175, 280, 350, 400, 500, 700, 1050, 1500, 2000, 2350, 2700m
16103-6	20° 46,71'	18° 44,13'	2723	10, 30, 6 x 50, 70, 90, 110, 130m
16105-1	20° 43,58'	18° 43,04'	2738	20, 40, 60, 80, 100, 120, 2 x 140, 2 x 200, 2 x 250m
16106-2	20° 39,99'	18° 20,00'	1353	10, 30, 50, 70, 90, 110, 130, 150, 175, 600, 1150, 1300m
16108-2	20° 44,71'	18° 44,73'	2795	3 x 20, 40, 60, 80, 100, 125, 150, 175, 200, 250m
16109-3	20° 55,00'	19° 25,01'	3460	10, 30, 50, 70, 90, 110, 130, 150, 175, 400, 1000, 2200m
16110-2	20° 35,99'	18° 42,61'	2645	down to 1000m, no water samples taken

2.8. Marine Geology

2.8.1 Particle fluxes and size spectra measured with drifting particle traps

(I. Klawonn, M. Klann, G. Ruhland, G. Fischer)

We deployed a drifting array equipped with two cylindrical particle traps (Fig. 14) on January 22nd (DF-3) and on January 24th (DF-4). The drifting trap DF-3 was launched at 20°46,88'N/18°44,29'W and recovered at position 20°43,25'N/18°42,88'W; drifting trap DF-4 was launched at the terminate position of DF-3 and recovered at position 20°35,30'N/ 18°42,28'W (see station list). They were deployed for 24 h and 48 h, respectively, both with traps in 100 and 400 m. Total drift distance was almost 11 nm.

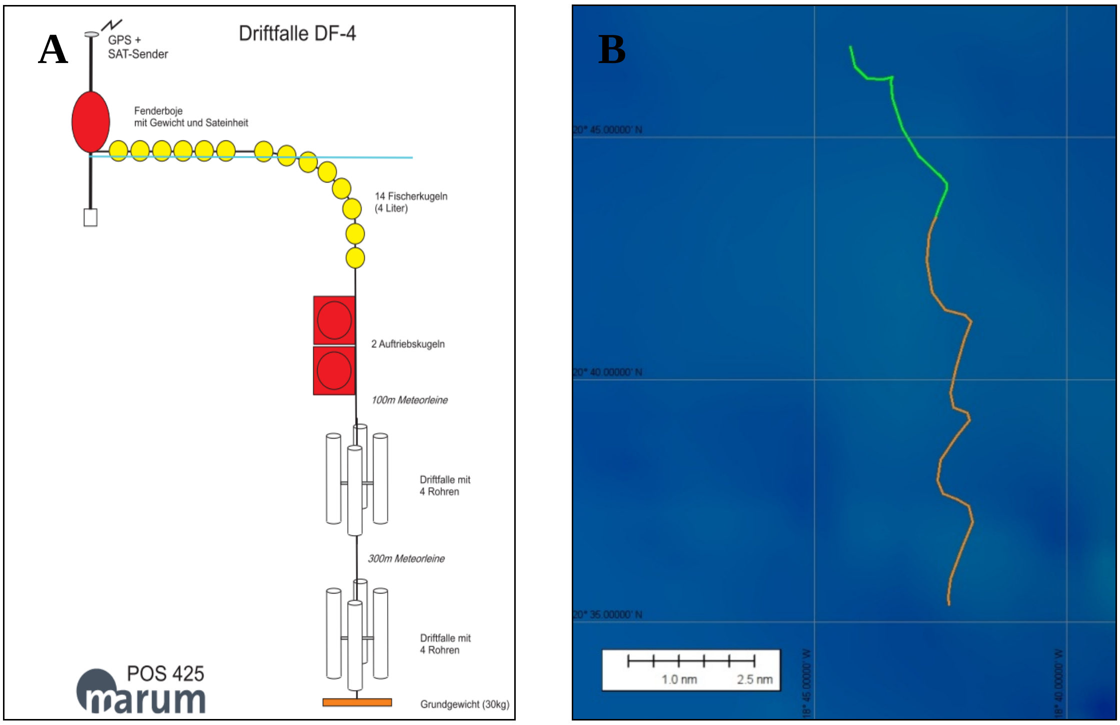

Fig. 14. (A) Drawing of the drifting sediment trap array with satellite transmitter in the upper left hand side attached to a buoy, followed by floaters to break wave movement, two buoyancy balls, two traps in 100 and 400 m, and a weight of 35kg. (B) Track course of the drifting sediment traps DF-3 (green line) and DF-4 (orange line) during the three days of deployment. In total, DF-3 and DF-4 drifted about 11 nm southwards. The course was followed with a satellite tracking system (GlobalTrack, South Africa), reporting a GPS position of the drifting sediment trap array every two hours.

Each trap was equipped with two collection cylinders with a viscous gel at the bottom and two collection containers without a gel insert. The determination of mass fluxes without gel inserts is a first step in measuring the POC export, but the characteristics of particles are lost because particles can disaggregate or form new agglomerations. The deployment of gel inserts provides a slow deceleration of sinking particles and particles keep their original shape and size (Ebersbach aud Trull, 2008). The material caught in the gel will be used to estimate particles` size spectra of settling material via image analyses. This will provide details on which types of particles are important for vertical export of organic carbon and which particles are more likely to be recycled in the upper water column. By relating the mass fluxes to the particles` size spectra obtained by the gel traps, we can estimate size-specific fluxes to 100 and 400 m depth. In combination with results yielded with the particle camera ParCa-Pro (chapter 2.6.) which gives us the *in situ* distribution of particles, we get a definite picture of the vertical export, aggregation and degradation of POC in the coastal upwelling area off Cape Blanc (Mauritania).

Prelimary Results

Some days before launching the drifting sediment trap arrays, a dust outbreak form the Sahara occurred (19/20th of January 2012, Fig. 2) (chapter 2.1). Airborne dust has been shown to change the ocean's carbon cycle by fertilisation and/or by ballasting organic-rich particles. Off Cape Blanc, Mauritania, the import of nutrients and organic matter may have boosted primary production indicated by 1) a high chlorophyll a content of about 0.2–0.6 µg L^{-1} from 0 to 80 m measured with a CTD-chlorophyll fluorescence sensor, and 2) a high abundance of phyto- and zooplankton captured with plankton nets (chapter 2.4). Accordingly, particle abundances in 100 and 400 m were likely higher compared to cruise MSM18-1. Traps off 100 m depth contained parts of intact filamentous phytoplankton, indicating the early stage of vertical export of primarily produced material and particle aggregation (Fig. 15). To that effect, fecal pellets were rare in 100 and 400 m water depth. Similar studies during the cruise MSM 18-1 in April-May showed high abundances of fecal pellets at 100 m and less fecal pellets in 400 m, which indicated a rapid recycling of fecal pellets, likely due to fragmentation/degradation by copepods or protozoans in the upper water column (Iversen and Poulsen, 2007; Poulsen and Iversen, 2008).

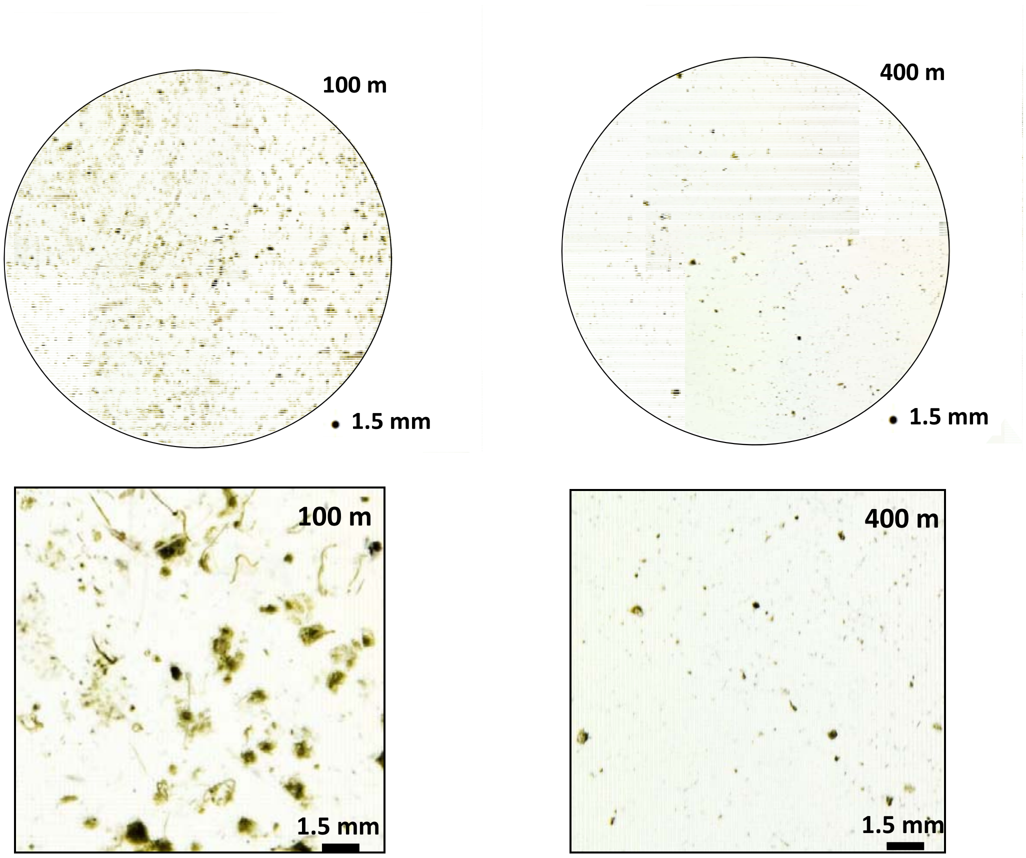

Fig. 15. Images of particles captured with the gel-filled inserts after recovery. Upper: Whole gel insert off 100 and 400 m depth, respectively (scale as dot). Lower: Detail of insert gel (scale as bar). Particle abundance and mean particle size was higher in 100 m depth. At 100 m, parts of the material were non-aggregated fragments of phytoplankton having a filamentous structure. At 400 m, aggregates were smaller, less abundant and we found none non-aggregated material.

The ballasting effect of lithogenic material on the sinking velocity of marine aggregates implies a high carbon export due to increased aggregate density and sinking velocity (reduced residence time in the water column) when ballast minerals are incorporated into the aggregates or due to the protection of the organic matter from decomposition (Armstrong et al., 2002; Iversen and Ploug, 2010; Ploug et al., 2008). This assumption can partly be tested by analysing the material in cylinders without gel inserts for organic carbon in relation to opal, carbonate or lithogenic material. The sandstorm occurring during the cruise will give us the rare opportunity to analyse the instantaneous effect of a large input of airborne dust from the Sahara on vertical short-term fluxes of organic carbon and particle transport.

2.8.2 Particle fluxes measured with moored sediment traps

(G. Ruhland, N. Nowald, M. Klann, G. Fischer)

It was planned to recover and redeploy the mooring CB-22/23 which is located about 200 nm off Cape Blanc (Mauritania). This mesotrophic study site operated since 1988 is located at the edge of the Cape Blanc filament in about 4150 m water depth. It is used to monitor the long-term change of particle fluxes in the Mauritanian offshore upwelling zone. An additional mooring named CBi-9 was deployed during MARIA S. MERIAN 18-1 cruise around 80 nm further to the east and was also planned to be exchanged to CBi-10. The data of deployments and recoveries of the moorings are listed in Table 8 alongside with the sampling data of the traps.

In the afternoon of January 18th, 2012, the mooring CB-22 was successfully recovered. It was originally planned to recover the moorings approximately in March or April 2012. The lower installed particle trap had worked perfectly but due to the early cruise schedule, the sample set has not been completed and we reached only cup no. 16. A timeout failure in the upper trap resulted in a single turn of the sampling mechanism and therefore delivered only one sample of the whole mooring time interval. The mooring was redeployed as CB-23 with a similar configuration in the morning of January 19th, 2012.

At noon of January 21st, 2012 we released the 1500 m long mooring array CBi-9 in the coastal part of the Cape Blanc filament which was also equipped with two particle traps and the Multi-Sensor platform (MSP) equipped with a video camera to record sequences of sinking particles and a CTD-ACP to monitor oceanographic parameters at the same time. Two sets of samples (16 samples of each trap) of CBi-9 could be received. The sample sets have not been completed due the early recovery of the mooring. The video camera had recorded a set of video sequences, the CTD only logged data until June 2011 due to an error in programming. In the early afternoon of January 24th, the mooring array CBi-9 could be redeployed as CBi-10 (Fig. 16). Instead of the upper standard trap a modified particle trap (MSD trap) with two sampling turntables for 40 samples was installed. It is planned to recover and redeploy these moorings with RV POSEIDON in spring 2013.

Table 8. Data for recoveries and redeployments of the particle trap mooring arrays.

Mooring	Position	Water	Interval Depth (m)	Instr.	Depth (m)	Intervals (no x days)
Mooring recoveries						
Cape Blanc mesotrophic:						
CB-22	21°16,1' N	4160	05.05.11-	SMT 243 NE	1209	1 x 13 d, 19 x 17d
	20°51.0' W		05.04.12	SMT 243 NE	3617	1 x 13 d, 19 x 17d
Cape Blanc eutrophic:						
CBi-9	20°46.7' N	2720	01.05.11-	SMT 243 NE	1263	20 x 17d
	18°44.1' W		05.04.12	SMT 234 NE	1872	20 x 17d
Mooring deployments:						
Cape Blanc mesotrophic:						
CB-23	21°15,8' N	4160	20.01.12-	SMT 234 NE	1214	20 x 21.5d
	20°52.7' W		25.03.13	SMT 234 NE	3622	20 x 21.5d
Cape Blanc eutrophic:						
CBi-10	20°46.5' N	2712	26.01.12-	MS platform	1211	
	18°44.2' W		25.03.13	MSD trap	1318	1 x 4.75d, 39 x 10.75d
				SMT 234 NE	1875	1 x 15.5d, 19 x 21.5d

Instruments used:

SMT234 NE	= particle trap, KUM, Kiel
SMT243 NE	= particle trap (Titanium), KUM, Kiel
MSD trap	= particle trap, KUM, Kiel, 2 sampling tables (40 samples)
MSD platform	= platform with FSI-CTD and video camera

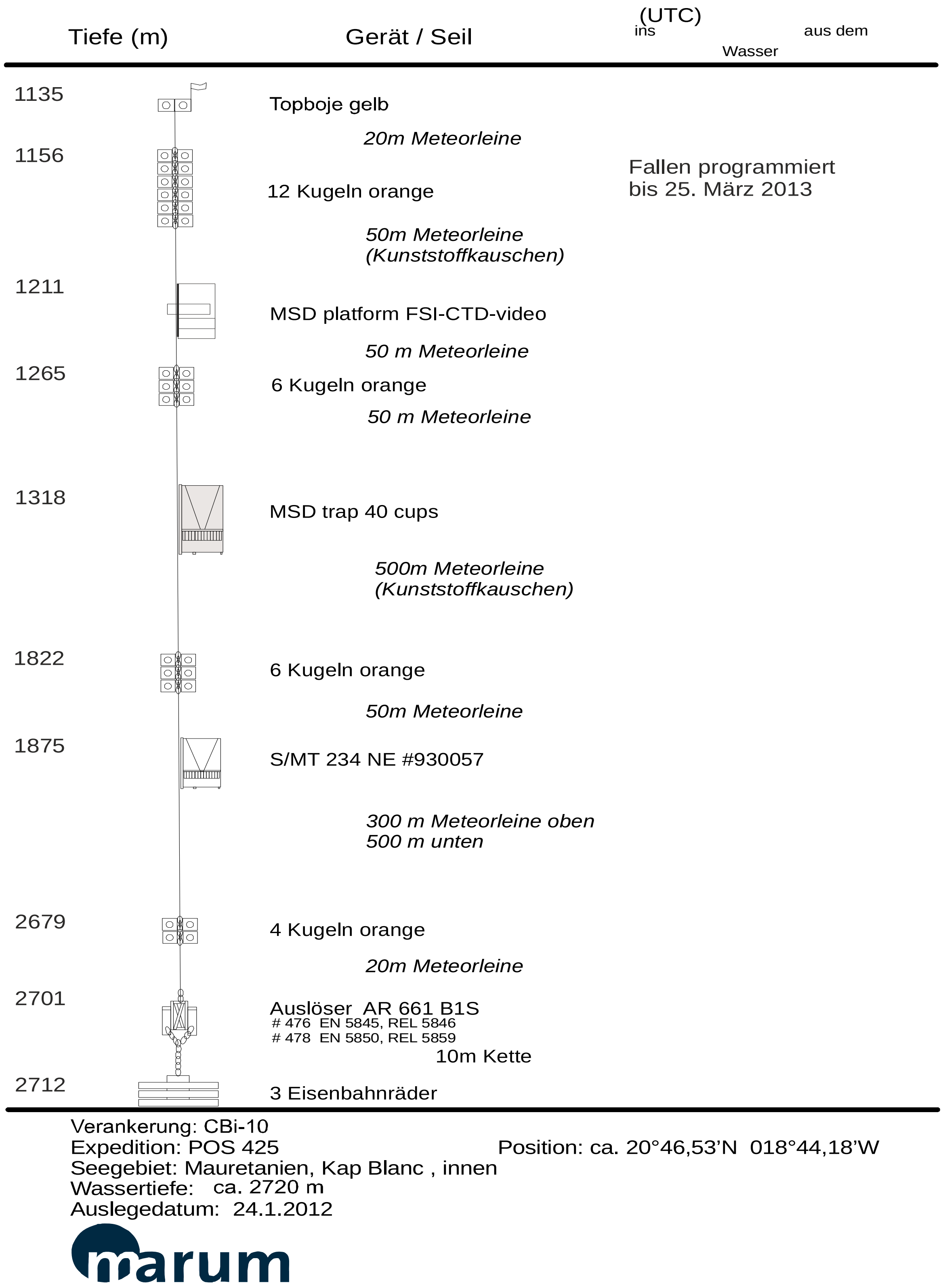

Fig. 16. Drawing of the sediment trap mooring array CBi-10 deployed during the cruise at the eutrophic site CBi. In the upper part of the array a Multi-Sensor (Device) platform (MSP) equipped with a video camera and FSI-CTD with ACP (Acoustic Current Profiler) instruments as well as a Multi-Sensor Device (MSD) sediment trap with 40 collection cups are installed.

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2.10. Acknowledgements

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3. Station List (POS 425)

GeoB #	Ships Stat. No	Date 2012	Device	Time at seafloor/ max. wire length [UTC]	Latitude N	Longitude W	Water depth [m]	Recovery/Remarks
16101-1	01/12	18.01.	CB-22	11:10	21°16.10’	20°50.99’	4160	Release and Recovery of sediment trap mooring: Upper trap at cup #1 Lower trap at cup #16 (o.k.)
16101-2			ParCa-Pro-Pro-CTD	15:03	21°16.09’	20°50.99’	4163	Down to 510m
16101-3			ParCa-Pro-Pro-CTD	17:10	21°16.10’	20°51.00’	4163	Down to 2055m
16101-4			ROS+CTD	19:30	21°16.09’	20°51.00’	4163	Down to 1000m
16101-5			ParCa-Pro-Pro+ ISP	23:07	21°16.09’	20°51.01’	4162	Down to 4020m (ParCa-Pro as weight for ISP): 55, 250, 350, 1000, 2500, 4000m
16101-6		19.01.	MN	08:27	21°16.09’	20°51.04’	4163	Down to 1000m: 1000-600, 600-400, 400-150, 150-80, 80-0m
16101-7			CB-23	13:28	21°15.84’	20°52.73’	4160	Deployment of mooring with two sediment traps, descent of top buoy
16102-1		20.01.	ParCa-Pro+CTD	18:33	20°36,96’	17°59,59’	755	Down to 735m
16102-2			ROS+CTD	19:25	20°37,05’	17°59,58’	756	Down to 730m: 10, 30, 50, 75, 100, 125, 150, 175, 200, 300, 450, 730m
16102-3			MN	20:42	20°37,02’	17°59,49’	754	Down to 700m: 700-600, 600-400, 400-150, 150-80, 80-0m
16102-4			ISP	22:00	20°37,01’	17°59,54’	755	Down to 730m: 50, 200,300,450,600,720m
16102-5		21.1.	MN	09:02	20°37,02’	17°59,41’	751	Down to 700m: 700-600, 600-400, 400-150, 150-80, 80-0m
16103-1			CBi-9	14:39	20°46,72’	18°44,12’	2720	Release and Recovery of sediment trap mooring: Both traps at cup #16 (o.k.)
16103-2			ParCa-Pro+CTD	19:36	20°46,71’	18°44,12’	2756	Down to 2670m
16103-3			MN	21:11	20°46,70’	18°44,10’	2735	Down to 1000m: 1000-600, 600-400, 400-150, 150-80, 80-0m
16103-4			ISP	23:17	20°46,72’	18°44,11’	2732	Down to 2700m: 700, 1050, 1500, 2000, 2350, 2690m
16103-5		22.1.	ROS+CTD	09:36	20°46,73’	18°44,13’	2733	Down to 2700m: 150, 175, 280, 350, 400, 500, 700, 1050, 1500, 2000, 2350, 2700m
16103-6			ROS+CTD	11:23	20°46,71’	18°44,13’	2735	Down to 155m: 10, 30, 50, 70, 70, 90, 110, 130m
16103-7			MN	13:34	20°46,72’	18°44,13’	2733	Down to 1000m: 1000-600, 600-400, 400-150, 150-80, 80-0m
16103-8			DF-3	16:26	20°46,88’	18°44,29’	2722	Deployment of drifting array: traps in 100 and 400m
16103-9			ISP	20:29	20°47,99’	18°44,51’	2712	Down to 510m: 50, 150, 280, 350, 400, 500m
16104-1		23.1.	ParCa-Pro+CTD	12:18	20°40,00’	18°20,00’	1353	Down to 1300m
16105-1	08/12		ROS+CTD	15:53	20°43,57’	18°43,02’	2740	Down to 600m: 20, 40, 60, 80, 100, 120, 140, 200, 250m
16105-2			DF-3	16:58	20°43,25’	18°42,48’	2722	Recovery of drifting array
16105-3			MN	18:28	20°43,23’	18°42,44’	2720	Down to 1000m:

GeoB #	Ships Stat. No	Date 2012	Device	Time at seafloor/ max. wire length [UTC]	Latitude N	Longitude W	Water depth [m]	Recovery/Remarks
								1000-600, 600-400, 400-150, 150-80, 80-0m
16105-4			ParCa-Pro+CTD	19:53	20°43,23'	18°42,43'	2718	Down to 610m
16106-1			ISP	23:50	20°40,02'	18°19,99'	1334	Down to 1310m: 50, 150, 280, 600, 1150, 1300m
16106-2		24.1.	ROS+CTD	08:40	20°40,04'	18°20,00'	1355	Down to 1300m: 10, 30, 50, 70, 90, 110, 130, 150, 175, 600, 1150, 1300m
16107-1	10/12		DF-4	12:23	20°43,35'	18°42,60'	2726	Deployment of drifting array: traps in 100 and 400m
16108-1	11/12		CBi-10	14:25	20°46,53'	18°44,18'	2712	Deployment of MSD platform and MSD trap and one conventional sediment trap, descent of top buoy
16108-2			ROS+CTD	15:43	20°44,72'	18°44,70'	2786	Down to 1500m: 20, 40, 60, 80, 100, 125, 150, 175, 200, 250m
16108-3			ParCa-Pro+CTD	21:19	20°44,72'	18°44,71'	2785	Down to 2754m
16109-1		25.1.	ParCa-Pro+CTD	07:52	20°55,04'	19°25,01'	3454	Down to 3400m
16109-2			MN	09:34	20°54,98'	19°25,01'	3454	Down to 1000m (day haul): 1000-600, 600-400, 400-150, 150-80, 80-0m
16109-3			ROS+CTD	12:01	20°55,01'	19°25,00'	3471	Down to 3000m: 10, 30, 50, 70, 90, 110, 130, 150, 400, 1000, 2200m
16109-4			ISP	14:51	20°55,00'	19°25,00'	3458	Down to 3410m: 50.150, 400, 1000, 2200, 3400m
16109-5			MN	20:59	20°55,00'	19°25,00'	3493	Down to 1000m (night haul): 1000-600, 600-400, 400-150, 150-80, 80-0m
16110-1		26.1.	ParCa-Pro+CTD	07:47	20°36,98'	18°42,50'	2636	Down to 2600m
16110-2			ROS+CTD	09:33	20°36,00'	18°42,62'	2628	Down to 1000m
16110-3			MN	10:37	20°36,00'	18°42,61'	2630	Down to 1000m: 1000-600, 600-400, 400-150, 150-80, 80-0m
16110-4			DF-4	12:30	20°35,30'	18°42,28'	2619	Recovery of drifting trap array

CB-22/23, CBi-9/10: meso- and eutrophic sediment trap moorings off Cape Blanc (Mauritania)

DF-3/4: Drifting trap deployed and recovered around the eutrophic CBi site

ROS-CTD: Multi-water sampler (rosette) with 12 x 10 l bottles and CTD-SBE-5 (Geomar)

PARCA-PRO-Pro-CTD: Particle Camera System with CTD-SBE-19 (No. 2069) inside the frame (CTD-O_2- chlorophyll-fluorescence-turbidity)

ISP: *in situ* pumps (six at maximum)

MN: multinet equipped with 5 nets each with 200µm mesh size

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